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THE CHRONICLE
of Early American Industries

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THE CHARCOAL BURNER

by JARED VAN WAGENEN

In the years of which I write, charcoal was one of the standard commodities. It was the sole fuel of the absolutely indispensable blacksmith — then a personage of very much more importance in the community economy than now. The tinsmith (in New England sometimes called "tin knocker") used it to heat his soldering coppers. In a few cases there were iron manufactories which demanded it in large amounts. Even today charcoal finds considerable use in the world but an ample supply is available as a by-product of the so-called "acid-factories" where wood is distilled in iron retorts.

Several old men have written me concerning the method of burning it, but the most exact data is from a correspondent in Oswego County.

Wood for charcoal burning was commonly cut about four feet long. Any kind of wood might be used but elm was considered especially desirable. The man who laid the kiln began with a pile of light, dry kindling wood in the center. Around this the wood was set up on end, leaning toward the center and this was continued until a round pile was made about twenty feet in diameter. On top of this lower pile, another pile was constructed, the wood being set on end as before. A "pit" commonly contained 25 to 30 cords of four-foot wood. When complete the pile was thickly covered with earth and sods, and in general shape might have suggested an old-fashioned straw bee hive. Openings were left in the earth covering to give some draught at the beginning. When all was ready, the pile was fired by thrusting burning poles into it, and as soon as it was thoroughly on fire, all openings were closed with earth. To burn a "pit" satisfactorily required no small degree of

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PAPER INDUSTRY II, 1810 - 1860

by CHARLES I. FOSTER

Faced with the rapidly mounting demand for paper as the people of the country placed more and more faith in the power of the printed word, the paper mills sought to overcome two severe obstacles to increased production: cotton and linen rags formed the only supply of raw material and they were scarce; the latter half of their manufacturing process was entirely unmechanized and laboriously slow. Often three or four months elapsed in the conversion of rags to paper.

The search for a new and plentiful raw material was fairly frantic. There were experiments with various grasses, cabbage stumps, corn husks and stems, nettles, ferns, bagasse, cotton stalks, wild indigo and banana plants. Many of these fibers made paper of sorts, but not economically nor of a quality to compete with rags. The single success in this field was registered by Matthias Koops in England who made good paper of straw in 1800. By 1827 we had started to use this new raw material, not for printing and writing papers, but for paper boards with which to bind books and make boxes.

In spite of experiment and search, rags continued to be the only supply of fibers for printing and writing papers in America until after the Civil War. People brought rags to the printer where the wagon from the paper mill picked them up and bell carts roamed the streets of our cities but the domestic supply failed to meet the situation. Importation provided the necessary supplement to keep our mills going. In 1829, the mills of Massachusetts consumed 1700 tons of rags a large proportion of which came from Italy and Germany. Difficult as the raw material problem proved to be, the historian cannot but give thanks as he examines the tough and durable

FALL MEETING STATEN ISLAND HISTORICAL SOC.—OCT. 17th and 18th

documents of the period, that the papermakers were obliged to use rags.

While the mills scratched feverishly for more plentiful supplies of fiber, the other main obstacle to greater production, the mechanization of the latter half of the manufacturing process, received quite as much attention with more successful results. The first move to replace the vatman by a machine came in the early years of the ninteenth century with the invention of the cylinder machine by Dickinson in England. This engine employed a drum, faced with mesh wire, which rotated in the vat. Suction applied to the interior of the drum drew fibers to the wire surface and as the drum rotated, the layer of meshed fibers were peeled from the drum, a continuous web of paper. In 1816, Joshua Gilpin successfully adapted the Dickinson principle to a machine which went into operation in the Thomas Gilpin mill near Philadelphia where it did the work of ten vatmen. In the years, 1818 to 1839, numerous American mills installed these machines a number of which were manufactured by John Ames and Isaac Burbank of Worcester, Massachusetts but their adoption was not very rapid for as late as 1829 only six of sixty Massachusetts mills had papermaking machines of any type.

Probably one reason for the relatively slow adoption of the cylinder machine was the fact that it was better suited to the manufacture of paper board than to the lighter weights which the country required for its literature. Today that process is used exclusively for making container and card stock.

But the same period which saw the development of the cylinder machine brought an invention which completely solved the problem of making and drying light weight paper in a continuous web at high speed. As much as any other single factor, the Fourdrinier machine made possible the mass production of literature for the common man.

The most important feature of this device was a long, endless belt of wire mesh on which the watery stock from the vat flowed in a continuous, regulated stream. Power applied to the rollers which sustained this wire belt rotated it steadily as it carried away its burden of watery fiber. Traveling on the edges of the wire mesh to keep the stock from spilling over the sides were two endless belts of heavy leather which took their name, "deckle straps," from the frame of the vatman's mold which served the same purpose. The Fourdrinier wire traveled far enough and slowly enough to permit most of the water to drip through the wire and the sheet of paper to form. At the end of the wire belt, the wet layer of paper was strong enough to carry its own weight a few inches to what was appropriately called the "couch roll" which in turn supported it to pressing rollers for further extraction of water. The Fourdrinier was a step in mechanization comparable in importance to the Hollander. Even in its early, crude form, it could accomplish the day's work of two vatmen and the two couchers of the typical mill in about an hour.

The development of this useful machine, according to findings of J. Wallace Tower, was the product of cooperation between Frenchmen and Englishmen during the Napoleonic wars. In 1799, Nicholas Louis Roberts took out the original patent in France. Two years later, Leger Didot purchased the Roberts patent and, with John Gamble, took it to England where Byron Donkin worked out its difficulties to make the device practical. By 1803, the machine was in operation under a patent granted to Gamble by the English Government. The next year, Henry and Sealy Fourdrinier, stationers and manufacturers, purchased the interests of Didot and Gamble and managed to put a second machine into operation. In 1806, Henry Fourdrinier became the sole proprietor of the English patents for the machine which bears his name.

Efficient as it proved to be, the Fourdrinier machine did not reach the United States for over twenty years after it went to work in England. The reason

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FALL MEETING RICHMOND, STATEN ISLAND

The fall meeting of Early American Industries Association will be held on Friday and Saturday, October 17 and 18, at Richmond, Staten Island, at the Staten Island Historical Society. The Society, established in 1856, has a building, the oldest part of which dates from 1680, and collections specializing in houses and period furnishings, with an enthusiastic group of members to further its work.

Meetings are planned so EAI members can spend the night in New York should they wish as Richmond is a Borough of New York City.

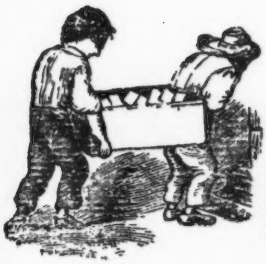
Announcements have been sent to all EAI members. Further inquiries should be addressed to the Secretary, or to Loring McMillen, c/o the Staten Island Historical Society, Richmond, N. Y.

Staten Island Historical Society Museum

Cobbler's Bench and Tools
Used by Isaac Haughwout
About 1830

The Stillwell-Perine House
Built about 1679
Dongan Hills, Staten Island, N. Y.
Owned by the Historical Society

The Voorlezer's House
Built about 1696
Located near and Owned by The Historical Society
Earliest Known Elementary School Building
in the United States



The Chronicle

Issued occasionally for members of
EARLY AMERICAN INDUSTRIES ASS'N

The purpose of the association is to encourage the study and better understanding of early American industry, in the home, in the shop, on the farm, and on the sea, and especially to discover, identify, classify, preserve and exhibit obsolete tools, implements, utensils, instruments, vehicles, appliances and mechanical devices used by American craftsmen, farmers, housewives, mariners, professional men and other workers.

EDWARD DURELL, *President*
500 Dublin Ave., Columbus, Ohio

MRS. FRANK D. PIERCE, *Secretary and Treasurer*,
Leicester, Mass.

WALLACE K. BROWN, *Vice President*
Monclair, N. J.

JOHN DAVIS HATCH, JR., *Editor*
125 Washington Ave., Albany, N. Y.

Communications regarding the contents of The Chronicle should be addressed to the Editor; Suggestions for members and other matters either to the President or the Secretary-Treasurer.

MEMBERSHIP: Regular membership $2.00. Supporting Members contribute $5.00 or more a year.

BACK NUMBERS of The Chronicle are available in some instances for fifty cents or one dollar, depending on rarity. Index to Volume I and II is available for one dollar each.

EDITOR'S COMMENT

Our President, Edward Durell, writes that he would appreciate members of the Association communicating with him at Columbus, Ohio (500 Dublin Avenue), telling him of what kind of meetings they would like to have in the fall and spring, kind of speakers, and subjects they would like to have covered, and any other constructive suggestions for the betterment of the Association. Any suggestions would be a helpful guide to the President and Directors in planning future meetings.

The Staten Island meeting should provide the opportunity for many to offer ideas which would be constructively useful and to meet the new President, who will have there a display of agricultural implements.

Paper II—*Continued*

for the delay may probably be found in the fact that it was a complicated piece of engineering, difficult for our crude shops to manufacture and costly to buy in a period when our mills did not command much capital. Of course, the idea came before the machine. For example, the Eagle Mill in Dansville, N. Y. had its own adaptation working in 1824, a wooden contraption thirty-six inches wide by twenty feet long which carried the stuff over a woolen blanket in place of the Fourdrinier wire. In one respect the Eagle Mill was quite advanced as the paper web traveled from the blanket over four heated driers. The steam-heated drying cylinders had been added to the English machine only the year before.

Finally, in 1827, Henry Barclay brought the first Fourdrinier machine from England to America and installed it at Saugerties, N. Y. In addition to the steam-heated drying cylinders, several other improvements had been added by that time. A woolen jacket on the couch roll helped to pick the paper from the end of the Fourdrinier wire; a second press roll meshed the fibers more firmly; a light roller, called the "Dandy" revolved on the wire near its dry end and impressed the soft paper with laid watermarks to make it resemble the hand-made product more closely and under the wire were suction boxes which pulled water through the mesh to permit higher machine speed.

After 1827, our adoption of the Fourdrinier was rapid. The next year saw a second machine set up in the mill of Joseph Pickering in North Windham, Connecticut, and with this working model at hand, our New England mechanics could solve the problem of manufacturing the Fourdrinier. Phelps and Spafford, later the Smith and Winchester Manufacturing Company, built the first American Fourdrinier in 1829.

It is interesting to note that this important date roughly coincides with the introduction of the steam-driven printing press. With mechanization completed, the American paper mills were prepared to feed the country's hungry printing plants which, in turn, supplied a nation's hunger for the printed word. Here is a clear example of the interdependent nature of our economic, social and intellectual life. These aspects of our history are as closely interwoven and meshed together as the fibers of the paper which gives expression to so much of it.

In spite of this mechanization of its various processes, papermaking remained distinctly an art rather

than an exact science. The craftsmen simply used more efficient tools. Once installed, the heavy and expensive Fourdrinier machine remained a fixture in the community for half a century and more while the secrets of its peculiarities passed from generation to generation. The long reign of the Fourdrinier had been protected by the fact that since its birth in 1799, no new principle of paper manufacture has appeared to render it obsolete. There have been minor improvements such as the introduction, in 1830, of tubular rollers under the wire mesh to draw water from the forming sheet by capillary action. This enabled the machine to further increase its speed. In the same year, the marked direction of grain in machine-made paper, a characteristic which distinguished it from the hand-made product, was partially overcome. It was caused by the natural tendency of the fibers to turn lengthwise in the current of stuff as it flowed onto the wire. To cross these fibers more effectively, the shopmen added a crank which gave the wet end of the machine a gentle lateral shake similar to the motion of the vatman as he lifted his filled mold from the vat.

But no refinement in the process has ever reduced papermaking to mechanical exactitude. As the requirements of art and industry have increased the variety and quantity of paper production, the skill of the papermaker and his intimate knowledge of his machine have been so much the more necessary. In this instance, the craftsman has remained a craftsman.

The Charcoal Burner—*Continued*

skill, judgement and vigilant care. If the fire threatened to break out at any point, the spot must be immediatly covered with fresh earth. The danger of the slow smouldering combustion turning into a conflagration was so great that the pit must be watched day and night for nearly two weeks. So the burner built a little cabin where he might be sheltered and possibly snatch cat naps as he watched the fire. Sometimes two pits were laid close together and the cabin built between so that a man might watch two fires instead of one.

My informant writes me that a cord of four-foot wood commonly made about thirty bushels of charcoal. It would seem, theoretically at least, that it should make more, but these were the figures given me. When burned the charcoal was drawn several miles to Oswego City and sold for 14 cents per bushel. In other words, after all his labor and care, he received say $4.20 per cord of wood — an indication of how our fathers toiled for a little money.

Perhaps I may be permitted to tell a charcoal story in which my great-grandfather figures as the victim, but I believe the same disaster has happened to other men. More than a century ago, by mother's grandfather — one Alexander McNeill — was a Scotch-Irish pioneer in the town of Carlisle, Schoharie County. He once finished burning a "coal-pit", and at evening the wagon — topped with a big slatted charcoal rigging, like a barley rack — was loaded in order that a very early morning start might be made for Albany — some 40 miles distance. He laid down to peaceful sleep and at the first streak of dawn arose and harnessed his team for the trip. When he came where his load stood, he found the irons of the wagon and nothing more. Evidently somewhere in the coal there had been a tiny speck of fire and when air reached it, the inevitable happened.

COMMUNICATIONS

From Floyd C. Shoemaker, the State Historical Society of Missouri:

"In connection with research we have undertaken recently in regard to the design of wagons used in the early pioneer period in the middle west, we have attempted to identify the type of wagon often referred to by the pioneer as 'the linchpin wagon.'

Oddly enough, we have been unable to find any detailed drawing, design, or picture of a wagon of this type (except, of course, the Conestoga wagon), and also have failed to find a published description indicating that this term designated only one kind of wagon.

From what we are able to find about the pioneer wagons in general use, it seems possible that the term 'linchpin wagon' may have referred to any wagon which had its wheels fastened to the axle with a linchpin.

Since the sources available to us do not seem to make these points clear, I am appealing to you for the following information: (1) did the term 'linchpin wagon' refer to any one general type of wagon, or, to all types of wagons which had the wheels fastened on the axle with linchpins; (2) can you supply a copy of a print or drawing showing the design of a wagon (or a wheel and axle) of this type; or (3) can you refer me to an illustration of such a wagon in a published work.

I shall appreciate any information you may be able to give me on these points."